Method of Test for
SLUMP OF PORTLAND CEMENT CONCRETE
DOTD Designation: TR 207-11

I. Scope

A. This method of test covers the procedure to be used for determining slump of portland cement concrete containing aggregates less than 1.5 in. (38 mm) in size.

Note 1: *When the concrete contains aggregates larger than 1.5 inch, wet sieve over the 1.5 in. sieve, discard the larger aggregates, and then proceed with the slump test.*

B. Reference Documents
1. DOTD S301-99, Sampling Fresh Concrete
2. ASTM C 143-05 - Slump of Hydraulic-Cement Concrete

II. Apparatus

A. **Mold** – the test specimen shall be formed in a mold made of metal not readily attacked by the cement paste. The metal shall not be thinner than 0.060 in. (1.5 mm) and if formed by the spinning process, there shall be no point on the mold at which the thickness is less than 0.045 in. (1.15 mm). The mold shall be in the form of the lateral surface of the frustum of a cone with the base 8 in. (200 mm) in diameter, the top 4 in. (100 mm) in diameter, and the height 12 in. (300 mm). Individual diameters and heights shall be within ± ⅛ in. (3 mm) of the prescribed dimensions. The base and the top shall be open and parallel to each other and at right angles to the axis of the cone. The mold shall be provided with foot pieces and handles. The mold shall be constructed without a seam. The interior of the mold shall be relatively smooth and free from projections. The mold shall be free from dents, deformation, or adhered mortar. A mold which clamps to a nonabsorbent base plate is acceptable, provided the clamping arrangement is such that it can be fully released without movement of the mold and the base is large enough to contain all of the slumped concrete.

Note 2: *Check and record conformance to the mold's specified dimensions when it is purchased or first placed in service and at least annually thereafter, or if the condition of any individual mold is suspected of being out of tolerance.*

B. **Tamping Rod** – a round, straight steel rod ⅝ in. (16 mm) in diameter and approximately 24 in. (600 mm) in length, having the tamping end or both ends rounded to a hemispherical tip, the diameter of which is ⅝ in. (16 mm).

C. **Measuring Device** – a rigid or semi-rigid ruler or metal roll-up measuring tape marked in increments of ¼ in. (5 mm) or smaller and at least 12 in. (300 mm) long.

D. **Base Plate** – flat, level, non-absorbent rigid surface

E. **Scoop** – small, metal ladle or dipper

F. **Applicable Documentation**
1. Batch Certification for Portland Cement Concrete (DOTD 03-22-4028)

2. Structural Concrete Tests (DOTD 03-22-0740)
3. Portland Cement Report (DOTD 03-22-4035)
4. Approved computer generated forms or spreadsheets

III. Health Precautions

Warning – Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.

A. Protect against potential injury by avoiding skin contact by wearing appropriate protective clothing and eye wear.
B. Observe all precautions as specified by the manufacturer.
C. If the freshly mixed concrete should contact skin or eyes, immediately flush with water for 5 minutes. If symptoms continue, consult a physician immediately.

IV. Sample

The sample of concrete from which test specimens are made shall be representative of the entire batch. It shall be obtained in accordance with DOTD S301-99 and meet the minimum sample quantity of 0.5 cu.ft. (0.01 cu. meters).

V. Procedure

A. Locate or prepare a flat, level, vibration-free surface for the performance of the test. Set the base plate on the surface and dampen the base plate.
B. Dampen the mold and place it on the base plate. Hold the mold firmly in place by standing on the two foot pieces or by clamping the mold to the base plate. Complete Steps V.C. to V.K. within an elapsed time of 2.5 minutes.
C. Scoop a representative portion of concrete from the sample and immediately fill the mold to approximately one-third of the volume of the mold.

Note 3: *One third of the volume of the slump mold fills it to a depth of 2⅝ in. (70 mm).*

D. Rod the layer with 25 strokes of the tamping rod throughout its depth. Uniformly distribute the strokes over the cross section of the layer, inclining the rod slightly and making approximately half of the strokes near the perimeter, progressing with vertical strokes spirally toward the center.

Note 4: *Do not tap the sides of the slump cone.*

E. Scoop additional concrete from the sample and fill the mold to approximately two-thirds of the volume of the mold.

Note 5: *Two-thirds of the volume fills it to a depth of 6⅛ in. (160 mm).*

F. Rod the second layer with 25 strokes of the tamping rod throughout its depth so that the strokes just penetrate into the underlying layer.
G. Scoop additional concrete from the sample and fill the mold to a level above the mold. Rod the third layer with 25 strokes of the tamping rod throughout its depth so that the strokes just penetrate into the underlying layer. If the level of concrete subsides below the top edge of the mold during rodding, add additional concrete to keep an excess above the rim at all times.

H. After the top layer has been rodded, hold the tamping rod horizontally and strike off the surface of the concrete by means of a screeding and rolling motion.

I. Remove concrete from the base of the mold and surrounding area.

J. Continue to hold the mold down firmly while stepping off of the foot pieces or unclamping the mold from the base plate. Remove the mold immediately from the concrete by raising it carefully and steadily in a vertical direction, without any lateral or twisting motion for a distance of 12 in. (300 mm) in 5 ± 2 seconds. Place the slump cone on the base plate next to the slumped concrete, but not touching the concrete.

K. Immediately measure the slump by determining the vertical difference between the top of the mold and the displaced center of the top surface of the specimen.

Note 6: *Measure the displaced center of the slumped concrete, not the original center of the base.*

Note 7: *If a decided falling away or shearing off of concrete from one side or portion of the mass occurs, disregard the test and make a new test on another portion of the sample. If two consecutive tests on a sample of concrete show a falling away or shearing off of a portion of the concrete from the mass of the specimen, the concrete probably lacks necessary plasticity and cohesiveness for the slump test to be applicable.*

VI. Report

Record the slump in terms of inches (millimeters) to the nearest ¼ in. (6 mm) of subsidence of the specimen during the test.

VII. Normal Test Reporting Time

Normal test reporting time is 5 minutes.